

# *Rising Mal-Employment and the Great Recession: The Growing Disconnection between Recent College Graduates and the College Labor Market*

*Neeta P. Fogg  
Paul E. Harrington*  
DREXEL UNIVERSITY

## INTRODUCTION

What is the value of a college degree in our recessionary economy? How much does the choice of an undergraduate major matter? Under what conditions are the economic gains from earning a college degree realized? This article looks at the phenomenon of mal-employment among college graduates in the United States, beginning with an overview of labor-market trends and the effects of the Great Recession on the job-market experiences of young people, including recent college graduates. It then defines “mal-employment” and examines its incidence over time. The article also reviews earnings differences between mal-employed college graduates and their counterparts across major fields of undergraduate study and

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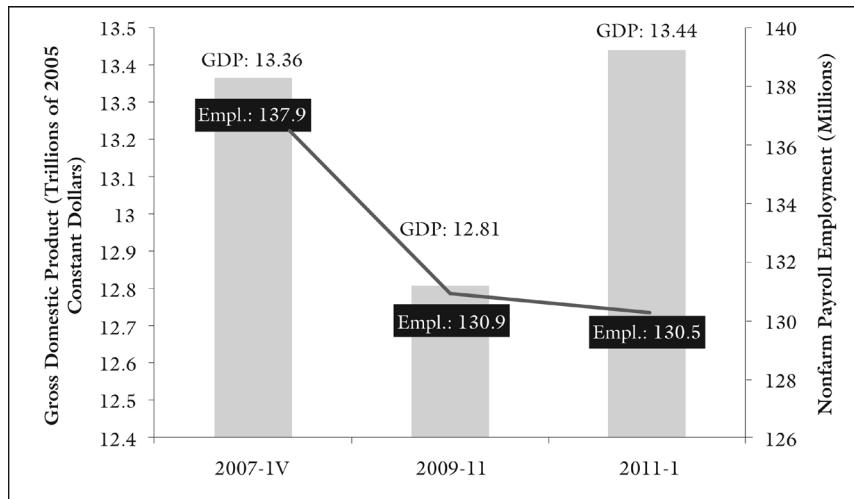
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presents estimates of the earnings premium or penalty for those who are appropriately or inappropriately employed. The findings are relevant to the choices that individuals and institutions make, especially as the nation adjusts to continuing conditions of excess supply in most labor markets for an extended period.

### THE GREAT RECESSION AND THE LABOR MARKET

The Great Recession began in December 2007 and officially ended in June 2009.<sup>1</sup> Over the course of the recession, the nation's gross domestic product (GDP) went from \$13.364 trillion during the fourth quarter of 2007 to \$12.810 trillion in the second quarter of 2009, a sharp decline of 4.1 percent. Since the official end of the recession in June 2009, the GDP has reversed its decline and as of the first quarter of 2011, it has surpassed pre-recession levels. During this period the nation's real GDP has increased from \$12.810 trillion in 2009-II to \$13.442 trillion in 2011-I, an increase of 4.9 percent.

While the nation has recovered its GDP losses and has managed to surpass pre-recession GDP levels, the same cannot be said about the labor market. The nation's output has recovered without a turnaround in jobs. Total nonfarm employment in the US declined from 137.9 million in the fourth quarter of 2007 to 130.9 million when the recession officially ended. This recession erased 7 million jobs—5.3 percent of the pre-recession employment levels. Even since the official end of the recession the nation's job market has failed to rebound: payroll employment levels were 400,000 jobs lower by the first quarter of 2011 than at the recession trough in the second quarter of 2009. Steep declines in employment and GDP characterize this recession as the worst economic downturn since the Great Depression, earning it the title, "The Great Recession."



Sources: GDP data were obtained from the Bureau of Economic Analysis, US Department of Commerce, July 1, 2001 ([www.bea.gov/national/index.htm](http://www.bea.gov/national/index.htm)). Data on Nonfarm payroll employment were downloaded from the BLS website on July 1, 2011 ([www.bls.gov/data/#employment](http://www.bls.gov/data/#employment)); tabulations by Drexel University Center for Labor Markets and Policy.

*Chart 1: Trends in the gross domestic product (in trillions of constant 2005 dollars) and nonfarm payroll employment (millions of jobs) in the US, 2007-IV to 2011-I*

The economic recovery has yet to manifest itself in the nation's job markets. A recent study has found that most of the rise in output and income during this recovery went to increased business profits without employment gains or earnings increases for the American worker.<sup>2</sup> The jobless economic recovery has meant high rates of unemployment and underutilization in the nation's labor markets. The nation's annual unemployment rate has more than doubled: 4.6 percent in 2007 to 9.3 percent in 2009 and 9.6 percent in 2010.

The nation's youth has borne a disproportionate brunt of the labor-market impact of this recession. Teenagers and young adults have seen a decline in employment opportunities as employers have increasingly shown a preference to hire older workers even in what are traditionally considered to be youth labor-market occupations.<sup>3</sup>

Since 2000, the employment rate of 16- to 19-year old teens declined from 45 percent to 35 percent in 2007 and 25.8 percent in 2010—an historical low. The employment rate of the nation's 20- to 24-year olds dropped from 72 percent in 2000 to 68 percent in 2007, and slid down to 60 percent in 2010, a decline of 8 percent during the three years since the beginning of the Great Recession.<sup>4</sup>

Although the employment-to-population ratio has declined sharply among all young adults between the ages of 20 and 24, employment rates have declined much more sharply among poorly educated young adults. At the bottom of the labor-market queue are high-school dropouts and high-school graduates without any postsecondary education; both groups experienced double-digit declines in employment, and the former, because of their precarious position at the bottom of the queue, are forced into joblessness.

In comparison, the 4 percentage-point drop in the employment rate of young college graduates, while quite substantial by historical standards, is much smaller and indicates that a college education has provided recent (young) college graduates some insulation from the worst effects of the recession on their likelihood of being employed.

### **MAL-EMPLOYMENT: DEFINITION AND MEASUREMENT**

The comparatively higher employment rates among college graduates—especially young college graduates—masks the rise of another type of labor-market hardship among them: “mal-employment.” As a result of labor-market slack and lack of suitable (to college graduates) employment opportunities, young college graduates have been choosing mal-employment over unemployment by accepting work in occupations that do not typically use the skills, knowledge, and abilities usually developed through a college education. For example, a political-science graduate working as a bartender or a business-school graduate working as a retail clerk might reasonably be categorized as mal-employed.

Mal-employment is a variant of the problem of underemployment in the labor market. Underemployment represents a job that is substandard in some way. The precise type of underemployment that occurs in the labor market is based upon the standard or referent against which the job is compared. The following five standards are frequently used to define underemployment or substandard employment:

- 1) a person possesses more education than the job requires;
- 2) a person is involuntarily employed in a job that is not related to his/her field of study;
- 3) a person possesses higher level of skills and more experience than the job requires;
- 4) a person is involuntarily employed in a part-time job;

- 5) a person earns substantially less than in a previous job (or among recent college graduates entering the labor market, a person earns substantially less than one's peers in the same field or occupation).

Based on the standard used, underemployed workers are labeled as overeducated, overqualified, over-skilled, underpaid, underutilized, or inadequately employed.<sup>5</sup> Substandard employment or underemployment is therefore inferior, lesser, or lower quality employment relative to the potential productive abilities of the worker.

Mal-employment, a variant of underemployment, is based on the concept of over-education. It represents a mismatch between skill requirements of the job and the education of the worker: the education of the worker exceeds the education and skill required to perform the job. Literature on over-education reveals that although there is no single measure of over-education or mal-employment, most researchers use one of four measures.<sup>6</sup> Two of these measures are subjective since they rely on incumbent worker reports of whether they are over-educated for their jobs or assess the minimum educational requirements for their job. The report or assessment is then compared with their educational attainment to determine if they are over-educated. The other two measures used to identify underemployment are objective by comparison: the first, "realized matches," derives the required education from the mean or modal level of education in the workers' occupation. The second is based upon a systematic evaluation of the job or occupation and a determination of the level of education required to perform the job.

Our definition of mal-employment combines the two objective criteria. We have used the findings from job analysis of each occupation provided in the US Department of Labor's O\*NET occupational-analysis information system to determine the level of education required to perform the job in each of the 900-plus occupations in the system.<sup>7</sup> O\*NET job analysis is based on extensive surveys of incumbent workers, supervisors, and experts in each occupational area. In cases where the analysis did not provide definitive answers, we have used realized matches and occasionally subjective judgments to determine the educational requirements of occupations.

Using primarily these measures we have identified a set of occupations that we label "college labor market" (CLM). This set generally includes professional, technical, managerial, and high-level sales occupations, which utilize the skills and knowledge that are commonly thought to be acquired

through a college education. Using this definition, those college graduates who are not in CLM occupations are considered mal-employed.

The problem of mal-employment or over-education in the labor market is not new. In a well-known reference to this problem, Richard Freeman claimed that during the 1970s the entry of well-educated baby boomers in the labor market was expected to cause a glut of educated workers; the oversupply of college graduates would lead to a decline in the economic returns of a college education.<sup>8</sup> In 2000, the *Economics of Education Review* published a special issue on over-schooling featuring extensive literature reviews, meta-analysis of over-education research studies, and articles on the findings from over-education research in the US and a number of European countries that measure the social and economic consequences and earnings deficits that arise from over-education.<sup>9</sup>

The recession of 2008-09 has exacerbated the problem of mal-employment. Increasing numbers of college graduates, particularly young and recent college graduates, were unable to find employment in CLM occupations and opted to become mal-employed rather than remain jobless. Some researchers have claimed that the incidence of over-education in the United States has been increasing over time and argue that the changing industry composition has resulted in fewer middle-tier jobs and increasing numbers of jobs at either end of the skill distribution—high skill and low skill, thereby forcing some of the well-educated and skilled workers into low-skill jobs.<sup>10</sup>

### MAL-EMPLOYMENT IN THE UNITED STATES

Using the 2000, 2007, and 2010 annual Current Population Survey (CPS)<sup>11</sup> data, we have measured the share of all employed college graduates who were working in CLM occupations and those who were mal-employed. Using CPS data on college-graduate employment by occupation, we have developed estimates of trends in the number and share of mal-employed college graduates in the US.

Over the past decade, the share of all college graduates of any age employed in a CLM job with a bachelor's degree declined from 75 percent in 2000 to about 72 percent in 2010. Conversely, this means that the share of employed college graduates with a bachelor's degree who were mal-employed increased from 25 percent in 2000 to 28 percent in 2010. About half of the increase in the mal-employment rate over the past decade occurred in just three years since the beginning of the recession in 2007.

The sharpest increase in the mal-employment rate between 2000 and 2010 occurred among the youngest college graduates (Table 1). Over the decade, the mal-employment rate increased by 9.3 percentage points among the youngest college graduates (20-24 years old) and 6.4 percentage points in the next age group of college graduates (25-29 years old) whereas their middle-aged counterparts saw a very small increase in the mal-employment rate—1.6 percent rise among 30-44 year olds and a decline of 0.6 percentage points among 45-54 year olds. Among pre-retirement age college graduates (55- to 64-years old) the mal-employment rate increased more sharply than for other middle-aged college graduates, by nearly 4 percentage points.

Age Group	2000	2007	2010	Change 2000 to 2010
<b>20 – 24</b>	29.8	34.2	39.1	9.3
<b>25 – 29</b>	23.5	26.1	29.9	6.4
<b>30 – 34</b>	24.6	25.1	26.2	1.6
<b>35 – 44</b>	23.6	24.9	25.3	1.7
<b>45 – 54</b>	26.5	26.1	25.9	-0.6
<b>55 – 64</b>	25.7	28.3	29.6	3.9
<b>All</b>	25.2	26.8	28.2	3.0

Source: US Census Bureau Current Population Survey annual public use micro data files 2000, 2007, 2010; tabulations by Drexel University Center for Labor Markets and Policy.

*Table 1: Mal-employment rates among employed college graduates with just a bachelor's degree by age, US annual average, 2000, 2007, and 2010*

The disproportionate rise in the mal-employment rates of younger employed college graduates means that mal-employment rate gaps have widened considerably between younger and older college graduates over the past decade. In 2000, the mal-employment rate among 20- to 24-year old college graduates with a bachelor's degree was 30 percent. The mal-employment rate was between 23 and 24 percent among 25- to 44-year old employed college graduates and slightly higher—26 percent—among their counterparts between 45 and 64.

By 2010, almost four out of ten employed young college graduates with a bachelor's degree were mal-employed. The 2010 rate was also quite high among 25- to 29-year old college graduates—30 percent. College graduates in the middle age groups (30- to 54-years old) experienced a mal-employment rate between 25 and 26 percent, while older college

graduates of pre-retirement age had a higher rate of nearly 30 percent. On average the mal-employment rate among 30- to 54-year old college graduates increased by just one percentage point between 2000 and 2010 while the youngest college graduates (20-24) saw their mal-employment rate increase by more than 9 percentage points. Consequently, the gap between the mal-employment rates of these two age groups of college graduates increased from five percentage points in 2000 to 13 percentage points in 2010. These findings are consistent with other research studies on over-education that find over-educated workers to be younger; have less work experience, job tenure, and employer-provided training; and have a higher rate of occupational and employment mobility than those workers who have the level of education required for the job.<sup>12</sup>

A comparison of the mal-employment rates of college graduates by degree level reveals that college graduates with a bachelor's degree were more likely to be mal-employed than those with a graduate or a professional degree. Some of these differences might be attributable to the older age and therefore potentially lengthier labor-market experience of college graduates with an advanced degree, allowing them more opportunities to change occupations and jobs to better match their education. It may also be due to the more focused nature of graduate and professional education, which is characterized by strong and specific career orientation for both students and academic disciplines in which a lot of graduate and professional education occurs, e.g., education, law, and health practice, that result in a greater access to CLM occupations among those with a graduate or a professional degree.

Using the 2009 American Community Survey (ACS)<sup>13</sup> data, we found that in 2009 the mal-employment rate among employed college graduates was 31 percent among those with just a bachelor's degree, 13 percent for those with a master's degree, and less than 7 percent for college graduates with a doctorate degree or a professional degree such as a JD or an MD.

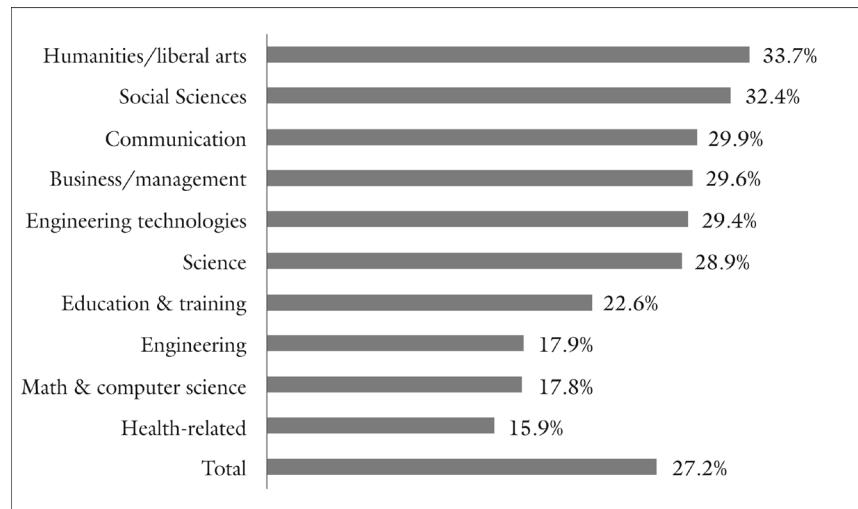
Educational Attainment of College Graduate	Mal-Employment Rate
<b>Bachelor's degree</b>	31.1%
<b>Master's degree</b>	12.8%
<b>Doctorate or professional degree</b>	6.6%

Source: US Census Bureau Current Population Survey annual public use micro data files 2000, 2007, 2010; tabulations by Drexel University Center for Labor Markets and Policy

*Table 2: Mal-employment rates among employed college graduates by level of educational attainment, US, 2009*

An important feature of the 2009 ACS is that for the first time, the ACS gathered information about the undergraduate major field of study from college graduates with a bachelor's degree. We have used these data to analyze the incidence of mal-employment by undergraduate major among college graduates with just a bachelor's degree who were employed in full-time and year-round jobs during the year prior to the ACS survey. We have defined a full-time and year-round job as a job that employs a worker for 35 or more hours per week and for 40 or more weeks per year. Our analysis found that 27 percent of college graduates with just a bachelor's degree who were employed in full-time and year-round jobs worked in non-CLM occupations and were thus classifiable as mal-employed.

The ability to access a CLM job varied widely across undergraduate major fields of study. Graduates who majored in health-related fields, engineering, and math and computer science fields were most successful in finding jobs in CLM occupations as evidenced by their below average mal-employment rates. Among full-time year-round employed college graduates from these majors, the mal-employment rate ranged between 16 and 18 percent. Education majors also had a below-average likelihood of being mal-employed (23 percent). The highest incidence of mal-employment was found among humanities and liberal-arts and social-science majors. One-third of full-time year-round employed college graduates with a bachelor's degree in these majors were mal-employed in 2009. Also high was the rate of mal-employment among business, communication, engineering technologies, and science majors at the bachelor's-degree-only level. In 2009, three out of ten full-time year-round employed college graduates with a bachelor's degree in these four major fields were mal-employed.



Source: US Census Bureau 2009 American Community Survey public use micro data file; tabulations by Drexel University Center for Labor Markets and Policy

*Chart 2: Mal-employment rates of college graduates with just a bachelor's degree, employed in full-time and year-round jobs by major field of study, US, 2009*

### MAL-EMPLOYMENT AND EARNINGS IN THE UNITED STATES

Earnings are positively related to workers' educational attainment, that is, workers with higher educational levels are expected to earn more than their counterparts with lower educational levels. The positive association between earnings and education is consistently observed in the labor market. The most common explanation for this association is found in the human-capital theory, which postulates that education increases the productivity of an individual and a more productive worker earns higher wages.<sup>14</sup> While additional education is expected to bring with it labor-market reward in the form of higher earnings, the size of this earnings premium from additional education is far from uniform across graduates, and varies by both personal characteristics—including demographic and socio-economic background traits and type of education—and major field of study. Structural characteristics of employment in different occupations exert influence on earnings as well, especially with respect to factors such as the knowledge, skill, and ability that an occupation utilizes in producing output.<sup>15</sup>

Analysis of the earnings of college graduates by their mal-employment status reveals that young college graduates who were mal-employed have seen a considerably larger earnings deficit compared to those who were employed in CLM occupations. Other studies on the association between

over-education and earnings have also found that over-educated workers earn less than workers with the same level of education who are employed in jobs that require the education that they possess.<sup>16</sup>

The earnings premium from securing employment in CLM occupations (or conversely the earnings penalty from mal-employment) is sizable for all college graduates young and mature and at each degree level. Findings from our analysis of the mean annual earnings of mal-employed and CLM-employed college graduates from the 2009 ACS data are presented in Table 3. Among all employed college graduates, those working in a CLM occupation earned almost twice as much (95 percent more) as those who were mal-employed. This annual earnings premium from working in a CLM occupation stood at 77 percent among workers with a bachelor's degree, 66 percent among those with a master's degree, and 139 percent among workers with a doctorate or a professional degree.

	CLM Employed	(Non-CLM) Mal-Employed	CLM/ non-CLM
<b>All Employed</b>	<b>Mean Annual Earnings</b>		
Bachelor's degree	\$66,508	\$37,624	1.77
Master's degree	\$75,718	\$45,524	1.66
Doctorate or professional degree	\$119,867	\$50,066	2.39
Total, Bachelor's or more	\$76,290	\$39,052	1.95
<b>Full-Time, Year-Round Employed</b>	<b>Mean Annual Earnings</b>		
Bachelor's degree	\$76,410	\$49,609	1.54
Master's degree	\$86,723	\$62,547	1.39
Doctorate or professional degree	\$134,737	\$71,340	1.89
Total, Bachelor's or more	\$87,297	\$51,871	1.68

Source: US Census Bureau 2009 American Community Survey public use micro data file; tabulations by Drexel University Center for Labor Markets and Policy

Table 3: 2009 mean annual earnings of employed and full-time year-round employed college graduates by their mal-employment status, US

The earnings premiums when gaining access to employment in CLM occupations at each college-degree level were also quite large among workers who were employed in full-time year-round jobs: a 68 percent earnings advantage among workers with any (bachelor's or higher) college degree and 54 percent, 39 percent, and 89 percent earnings advantage among workers with a bachelor's, master's, and doctorate/professional degree, respectively.

Some of the earnings benefits from securing a CLM job accrue from the more intensive employment (hours and weeks of work) in CLM occupations. In other words, some of the earnings advantages of college graduates employed in CLM occupations are attributable to their access to full-time and year-round work. However, the earnings advantage of CLM-employed college graduates relative to their mal-employed counterparts remains quite large even after controlling for their work intensity over the course of a year. Among full-time and year-round employed college graduates, the annual earnings of those working in CLM occupations were two-thirds larger than the mean annual earnings of those who were mal-employed.

Table 4 displays the earnings premiums from securing employment in CLM occupations among college graduates by undergraduate major field of study. These data reveal that both major field of study and mal-employment status influence the annual earnings of those employed with just a bachelor's degree. Business majors secure the highest earnings premium from access to CLM jobs. The mean annual earnings of these majors who were employed in CLM occupations was \$37,800—87 percent higher than those who were mal-employed (working in non-CLM occupations). Even among full-time year-round employed business majors, the earnings of those in a CLM occupation exceeded the earnings of their mal-employed counterparts by \$35,700 (70 percent). The annual earnings of CLM-employed graduates relative to their non-CLM counterparts ranged from 70 to 79 percent among math and computer science, health-related, social sciences, engineering, communications, and humanities/liberal arts majors. Employment in CLM occupations relative to mal-employment resulted in annual earnings premiums of 56 to 61 percent among graduates who majored in area studies, sciences, and law. Even among education majors, who had the smallest CLM to non-CLM earnings difference, the size of the earnings advantage from access to a CLM job was a substantial 43 percent. The earnings premium from employment in a CLM occupation relative to mal-employment was smaller (albeit still quite large) among full-time year-round employed than all employed bachelor's degree college graduates in each of these major fields of study.

Undergraduate Major Field of Study	Emp. Status	Employed in CLM Occs.	Employed in non-CLM Occs.	Absolute Difference	Relative Difference
<b>Business/Management</b>	All empl.	\$81,391	\$43,633	\$37,759	87%
	FTYR	\$87,003	\$51,300	\$35,703	70%
<b>Math &amp; Computer Sci.</b>	All empl.	\$79,433	\$44,391	\$35,042	79%
	FTYR	\$84,660	\$53,685	\$30,975	58%
<b>Health-Related</b>	All empl.	\$61,589	\$35,115	\$26,474	75%
	FTYR	\$69,950	\$45,019	\$24,931	55%
<b>Social Sciences</b>	All empl.	\$66,649	\$38,089	\$28,560	75%
	FTYR	\$74,327	\$47,004	\$27,323	58%
<b>Engineering</b>	All empl.	\$88,488	\$50,791	\$37,697	74%
	FTYR	\$93,654	\$58,537	\$35,117	60%
<b>Communication</b>	All empl.	\$63,802	\$36,630	\$27,172	74%
	FTYR	\$71,246	\$46,333	\$24,912	54%
<b>Humanities/ Liberal Arts</b>	All empl.	\$57,027	\$33,265	\$23,763	71%
	FTYR	\$66,586	\$42,616	\$23,970	56%
<b>Area Studies</b>	All empl.	\$53,051	\$33,014	\$20,036	61%
	FTYR	\$60,037	\$42,304	\$17,733	42%
<b>Science</b>	All empl.	\$64,386	\$41,141	\$23,245	56%
	FTYR	\$72,119	\$50,460	\$21,659	43%
<b>Legal</b>	All empl.	\$59,699	\$38,167	\$21,532	56%
	FTYR	\$62,884	\$44,157	\$18,727	42%
<b>Education/Teaching</b>	All empl.	\$43,820	\$30,555	\$13,265	43%
	FTYR	\$49,713	\$40,268	\$9,445	23%

Source: US Census Bureau 2009 American Community Survey public use micro data file; tabulations by Drexel University Center for Labor Markets and Policy

*Table 4: 2009 mean annual earnings of employed and full-time year-round employed college graduates with just a bachelor's degree, by undergraduate major field of study and mal-employment status, US*

## CONCLUSION

Most observers agree that a college degree yields, on average, a large earnings advantage. But our findings reveal that this advantage is heavily dependent on the ability of college graduates to find employment in CLM occupations. College graduates who work in semiskilled / unskilled blue-collar, low-end service and sales, transportation and warehousing, and other occupations outside of the CLM experience have much lower annual earnings that may not justify the economic and personal costs of completing a college degree program.

Sadly, a large and growing share of recent college graduates is falling into this group. Young adults are making substantial investments of time and money in their college education; yet almost two out of five are unable to find employment in occupations appropriate to their skills and knowledge. The issue of college as preparation for a vocation aside, students must be made aware of the implications of the choices they make early during their time at a college or university. Much more intensive career planning that starts at the beginning of the undergraduate experience instead of at its termination is especially important. Developing greater focus on career goals early in the undergraduate experience and in organizing course taking, travel, and work experiences can assist students in achieving these goals and reduce the risk of mal-employment upon graduation.

For those students who want guidance, institutions of higher learning need to help guide these young people in making appropriate decisions through more effective and longer-term career counseling that links the curricular and extracurricular choices of students to their career goals. Cooperative education, internships, and similar work experience programs connected to employment in CLM occupations are increasingly important for success in this difficult labor-market environment.

The United States system of higher education has long been the envy of other nations because of its success in allowing individuals to access it. But as our data and analysis have shown, it is not enough to educate young people; we must also prepare them, and help them find the most appropriate labor-market outlets for their educational background and skills. 

### ENDNOTES

1. The Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) determines the peak and trough dates of each business cycle. NBER announced the June 2009 trough in September 2010. For a listing of the dates and durations of past business cycles, see <http://www.nber.org/cycles.html>.
2. Andrew Sum, et al., *The "Jobless and Wageless" Recovery from the Great Recession of 2007-2009: The Magnitude and Sources of Economic Growth Through 2011-I and Their Impacts on Workers, Profits, and Stock Values*, Center for Labor Market Studies, Northeastern University, May 2011 (also available at [http://www.clms.neu.edu/publication/documents/Revised\\_Corporate\\_Report\\_May\\_27th.pdf](http://www.clms.neu.edu/publication/documents/Revised_Corporate_Report_May_27th.pdf)).
3. Neeta P. Fogg and Paul E. Harrington, "Rising Demand for Older Workers Despite the Economic Recession: Accommodation and Universal Design for the New American Workforce," *Public Policy and Aging Report*, National Academy of an Aging Society, The Gerontological Society of America, Volume 21, No. 1, pp. 11-17.
4. Source: US Bureau of Labor Statistics website, (<http://data.bls.gov/pdg/querytool.jsp?survey=ln>). Downloaded on July 1, 2011.

5. For a thorough discussion of the alternative definitions of underemployment see Frances M. McKee-Ryan and Jaron Harvey, "I Have a Job, But . . .": A Review of Underemployment," *Journal of Management*, July 2011 (first published online in February 28, 2011), Vol. 37, No. 4, pp. 962-996, and Daniel C. Feldman, "The Nature, Antecedents, and Consequences of Underemployment," *Journal of Management*, 1996, Vol. 22, No. 3, pp 385-407.
6. Wim Groot and Henriette Maassen van den Brink, "Overeducation in the Labor Market: A Meta-Analysis," *Economics of Education Review*, April 2000, Vol. 19, Issue 2, pp. 149-158; Joop Hartog, "Over-Education and Earnings: where are we, where should we go?" *Economics of Education Review*, April 2000, Vol. 19, Issue 2, pp. 131-147.
7. For a complete discussion of O\*NET and to gain access to its content go to <http://www.onetonline.org/>.
8. Richard B. Freeman, *The Overeducated American*, Academic Press, New York, 1976.
9. "Special Issue on "Overschooling," *Economics of Education Review*, Vol. 19, Issue 2, April 2000.
10. Stephen Vaisey, "Education and its Discontents: Overqualification in America, 1972-2002," *Social Forces*, December 2006, Vol. 85, No. 2, pp. 835-864; Robert Kuttner, "The Declining Middle, *Atlantic Monthly*, July 1983, pp. 60-72.
11. The CPS is a monthly survey of 60,000 households conducted by the US Census Bureau. The CPS is the primary source of information on the labor force characteristics of the working-age population. We have combined 12-month CPS public use micro data files to gain some insight into changes in the incidence and composition of mal-employment in the nation.
12. Nachum Sicherman, "Overeducation in the Labor Market," *Journal of Labor Economics*, 1991, Vol. 9, No. 2, pp. 101-122.
13. The ACS is a large-scale household survey conducted by the US Census Bureau that produces a wide variety of data on demographic, social, economic, and related characteristics of the population, nationally and at the state and local levels.
14. Gary S. Becker, *Human Capital*, National Bureau of Economic Research, New York, 1964.
15. Peter Dolton and Anna Vignoles, "The Incidence and Effects of Overeducation in the UK Graduate Labor Market," *Economics of Education Review*, Vol. 19, Issue 2, April 2000.
16. For an examination of the relationship between over-education and earnings see: (i) Joop Hartog, "Over-Education and Earnings: Where Are We, Where Should We Go?" *Economics of Education Review*, Vol. 19, Issue 2, April 2000, pp. 131-147; (ii) Mary C. Daly, Felix Büchel, Greg J. Duncan, "Premiums and Penalties for Surplus and Deficit Education: Evidence from the United States and Germany," *Economics of Education Review*, Vol. 19, Issue 2, April 2000, pp. 169-178; (iii) Elchanan Cohn and Ying Chu Ng, "Incidence and Wage Effects of Overschooling and Underschooling in Hong Kong," *Economics of Education Review*, Vol. 19, Issue 2, April 2000, pp. 159-168; (iv) Richard Verdugo and Naomi Turner Verdugo, "The Impact of Surplus Schooling on Earnings: Some Additional Findings," *The Journal of Human Resources*, Vol. 24, No. 4, Fall 1989, pp. 629-643; (v) Russell Rumberger, "The Impact of Surplus Schooling on Productivity and Earnings," *The Journal of Human Resources*, Vol. 22, No.1, Winter 1987, pp. 24-50; and (vi) Greg Duncan and Saul Hoffman, "The Incidence and Wage Effects of Overeducation," *Economics of Education Review*, Vol. 1, No. 1, Winter 1981, pp. 75-86.